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**B44C 1/17**

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(58) Field of search

**B6C**

**Selected US specifications from IPC sub-classes B44C  
B41M**

## (54) **Method of making dry transfers**

(57) An assembly comprising a translucent carrier sheet to which is laminated (by an adhesive or by vacuum deposition) a coating or layer of metal, e.g. aluminium, is printed with symbols, using an etch resist ink, and then subjected to an etching medium to etch away the non-printed metal areas. Thereafter, using e.g. holes for registration, the symbols are overprinted accurately with an adhesive which is then dried. The resultant transfer sheet (which may be overlaid by a protective sheet of release paper, such as silicone paper, if it is not to be used immediately) will give a bright durable metallic transfer comparable with that obtainable by gold blocking but without the expensive equipment associated with the latter, by simple traditional dry-transfer techniques.

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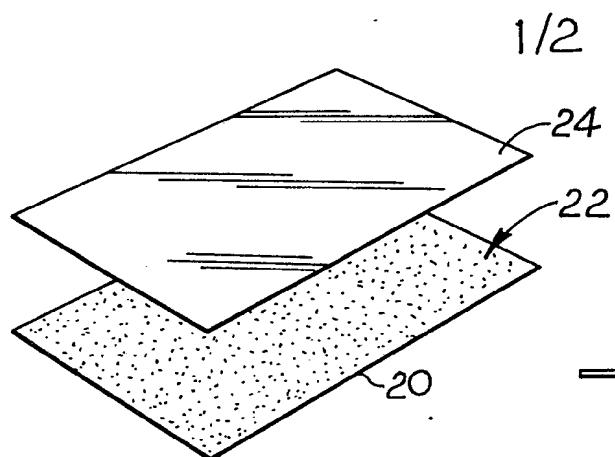


Fig. 1

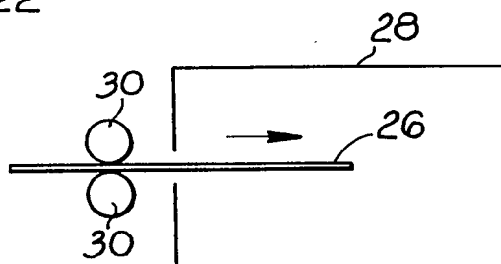


Fig. 2

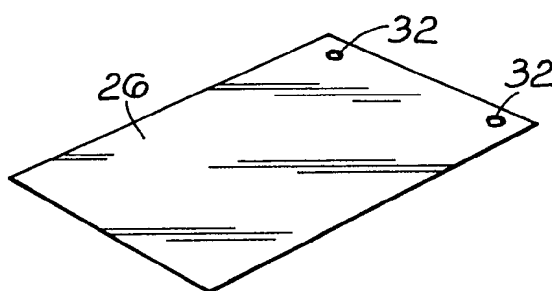


Fig. 3

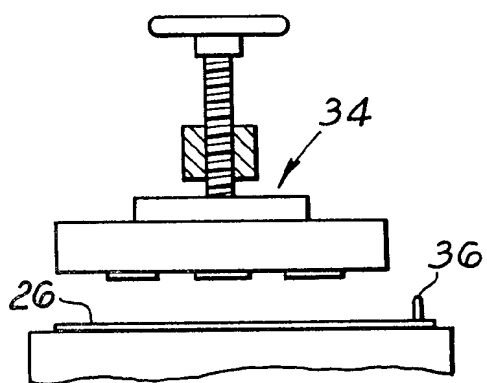


Fig. 4

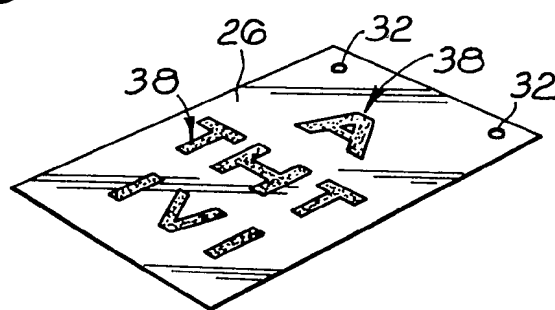


Fig. 5

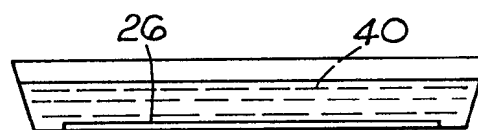


Fig. 6

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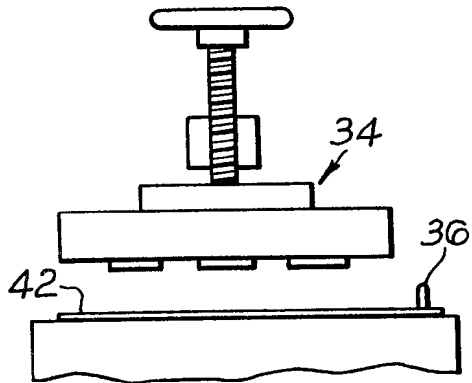


Fig. 7

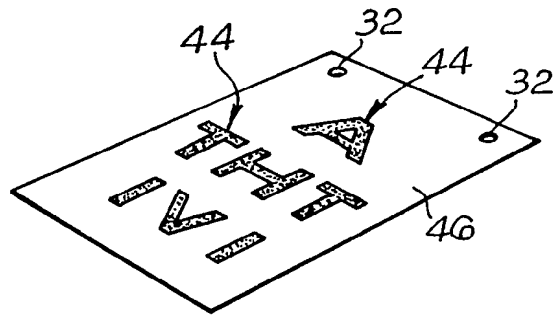


Fig. 8

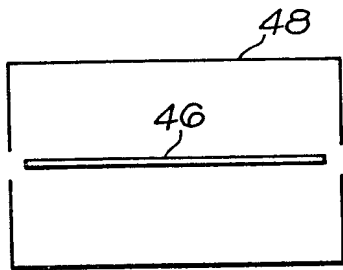


Fig. 9

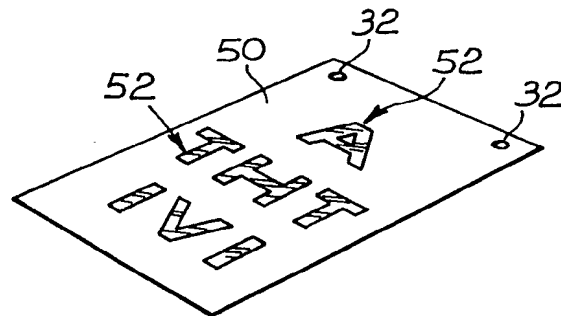


Fig. 10

## SPECIFICATION

### Dry transfers

5 This invention concerns dry transfers of the kind (hereinafter referred to as "of the kind described") comprising a carrier sheet carrying one or more symbols, which may be letters, numerals, mathematical notations, lines, geometrical figures, devices and so forth, which can be transferred onto a receiving surface by placing the sheet, symbols downwards, onto such receiving surface, and rubbing over the sheet to cause the symbols (or selected ones of the symbols) to become detached from the sheet and to adhere to the receiving surface.

When one requires to apply bright metallic lettering or the like to articles, such as books, resort is usually had to so-called "blocking".

20 This usually involves the use of a laminate known as "blocking foil", comprising a very thin and flimsy film of polyester plastics material overlaid, in turn, by a fine layer of release wax, a coating of lacquer, an aluminium deposit and an adhesive. Blocking is effected by applying the laminate over the article required to be lettered or otherwise marked, and use is made of a blocking machine which applies heat and pressure to those regions of the blocking foil required to be transferred to the surface of the article, thereby causing the adhesive to fuse and anchor the corresponding areas of lacquered aluminium to the article's surface, whereafter the rest of the foil is peeled away. This is quite an expensive and time-consuming procedure and, of course, involves both capital investment in the acquisition of the necessary blocking apparatus, as well as wastage of a significant proportion of the foil.

It is also known to provide dry transfers of the kind described in which symbols on the carrier sheet are printed in a so-called metallic ink superimposed by adhesive. In theory, these transfers provide lettering, designs, and the like, having a metallic appearance, but of course in these instances the aesthetic effect is matt, due to the metallic ink normally including metal powder (such as aluminium powder) distributed therethrough. It has not hitherto been possible to achieve metallic lettering or designs having a bright mirror-like appearance with the known dry transfer techniques; this has only been possible using the much more expensive, wasteful and time-consuming blocking techniques above discussed. As is well known, blocking itself can have the disadvantage that the resultant lettering and/or designs may not be durable. Especially in the case of books, for instance, the lettering can often deteriorate in appearance, and may perhaps wear away with handling.

An object of the present invention is to provide a method of producing dry transfers which incorporate bright metallic symbols so

that application of such symbols to a receiving surface can be effected using dry transfer techniques which, as will be understood from the foregoing, has the advantage of being more economical and convenient than the presently known blocking techniques and has not been possible hitherto.

With this object in view, the present invention provides a method of making a dry transfer of the kind described which comprises register marking a translucent carrier sheet having over one surface thereof a layer or coating of metal foil, printing said sheet with desired symbols on the metal foil layer or coating side thereof, exposing the so-printed carrier sheet to an etching medium so as to etch away the non-printed portions of the metal foil layer or coating, and thereupon printing the sheet, over the printed symbols only, with a pressure-sensitive adhesive, using the register marking to achieve registration of the printing.

If the dry transfers are not to be used straight away after production but are required to be stored, packaged, transported and/or distributed to users, the method of the invention preferably further includes the step of overlying the surface on which the adhesive is disposed with a protective sheet of a suitable release paper, such as a silicone paper.

In carrying the invention into effect, one may start with a carrier sheet or web of heat-resistant plastics film, such as polyester or polycarbonate and laminate the metal foil layer or coating thereto using a suitable adhesive between the sheet and the metal. Alternatively one may start with a carrier sheet as aforesaid and thereafter vacuum deposit a layer of metal, e.g. aluminium, thereon.

Achievement of the register marking can be effected in various ways suitable for ensuring that the carrier sheet is properly registered, e.g. in the same printing machine, for printing the adhesive over, and only over, the previously-printed symbols. This can be effected, for instance, by notches in one or more edges of the sheet is cut accurately to size and/or shape so that one or more corners or the like may be used for registration. Preferably, however, the sheet is punched or perforated at least at two positions to provide apertures for engagement with pegs or the like on the printing machine(s) to ensure registration.

The process may, of course, be effected in continuous web form when registration is achieved by usual printing procedures.

The invention will be described further by way of example with reference to the accompanying drawings which illustrate diagrammatically the details of the steps involved in carrying a preferred method of the invention into effect, it being understood that the following description is illustrative and not restrictive of the scope of the invention. In the drawings:—

Figure 1 is a diagrammatic perspective view

illustrating the step of assembling together a carrier sheet and a metal foil coating as a first stage in the said preferred method;

*Figure 2* is a diagrammatic side elevation illustrating the uniting of the carrier sheet and metal foil coating of Fig. 1;

*Figure 3* is a perspective view illustrating one way in which the carrier sheet/foil combination may be register marked as a further stage in the method of the invention;

*Figure 4* is a part-sectional diagrammatic elevation illustrating the carrier sheet/foil combination of Fig. 3 located in a schematically-illustrated printing press for printing symbols thereon;

*Figure 5* is a perspective view, comparable with Fig. 4, showing the construction having been printed;

*Figure 6* is a diagrammatic elevation illustrating the printed product of Fig. 5 being subjected to etching;

*Figure 7* is a view comparable with Fig. 4, but showing the etched product registered in the same or a similar printing machine for the printing of adhesive over the symbols;

*Figure 8* is a perspective view illustrating the product after printing the adhesive as in Fig. 7;

*Figure 9* is a diagrammatic elevation illustrating the product, overprinted with adhesive, being subjected to heat in an oven to dry the adhesive; and

*Figure 10* is a diagrammatic perspective view of the finished dry transfer.

Although the following description and the drawings serve to illustrate the individual steps or stages or stages which are involved in carrying the invention into effect as if they are separate or divorced from one another, it will readily be understood that the method of the invention may be carried out in continuous sequence with each of the stages involving receipt of the relevant components, processing them, and passing them on to the subsequent stage. Moreover the components may be supplied as one or more continuous webs which may be severed into individual sheets at any convenient stage in the method.

Turning now to Fig. 1 of the drawings, in carrying the present invention into effect, in one way, one starts with a carrier sheet 20 of plastics sheet material, e.g. film, preferably a heat-resistant plastics film, this film being translucent, and in fact nearly transparent. This carrier sheet 20 then has a very fine layer or coating of metal applied thereover. This may be effected, for instance, by applying over the sheet a layer 22 of adhesive, superimposing a layer of aluminium blocking foil 24 thereover, and thereafter, as shown in Fig. 2, passing the resultant assembly (indicated by numeral 26) through a curing oven 28, if desired with the application of pressure by passing it through one or more nips provided by pairs of pressure rollers 30. As an alternative, the alu-

minium foil layer may be applied to the carrier sheet 20, for example, by vacuum deposition (not illustrated).

The resultant sheet assembly 26 is now marked for future registration purposes. This may be achieved in the illustrated case by punching a pair of holes 32 through the sheet assembly 26 adjacent to one edge thereof. Of course, other forms of registration marking (such as any one or more of those already referred to herein) can be adopted as may be desired or practical.

Next, the carrier sheet/foil assembly 26 is positioned in a printing press, which is indicated diagrammatically at 34 in Fig. 4, engaging the registration holes 32 with appropriate registration pegs 36 provided for the purpose, whereupon the sheet assembly 26 is printed, over the metal coating or layer 24 with one or more symbols, such as numerals, letters, mathematical or other notations, as has been indicated very diagrammatically at 38 in Fig. 5, with a water-insoluble etch resist, (e.g. a varnish based ink), which is then allowed to dry. This having been done, the assembly 26 is then exposed to an etching medium 40 which may, for instance, be a solution of caustic soda, ferric chloride or the like, which then etches away, from the assembly 26, all of the metal layer or covering 24 which has not been printed with etch resist ink, so that metal layer areas are left corresponding to the desired symbols 38.

The etched assembly, now indicated by the numeral 42, is now returned to the same printing press 34, and is printed with the same symbols, but this time using a pressure-sensitive adhesive 44, see Fig. 8, (which adhesive 44 may, if desired, incorporate a coloured pigment so that its presence on the eventual sheet, now indicated by numeral 46, can be discerned). Registration of the sheet 42 in the press 34 is, of course, effected using the registration holes 32, to ensure that the printing of the adhesive 44 registers with and accurately overlies only the previously-printed symbols 38.

The sheet 46 is now taken through a drying oven 48 to dry the adhesive 44, and if it is not required for immediate use, a protective sheet of release paper (e.g. silicone paper), not illustrated, is applied over the adhesive side of the eventual finished transfer sheet 50 to ensure that the sheet 50 will not adhere to an adjacent sheet 50, if a plurality of the sheets 50 are stacked together for packing, storage or distribution. The eventual symbols, supported by the basic carrier sheet 20 and comprising foil 24 adhered to the sheet 20, an etch resist coating 38 and overprinted adhesive 44 which has subsequently been dried, have been indicated by the reference numeral 52.

The resultant dry transfer is used in exactly the same way as prior known dry transfers in

that it is applied by its printed side against a receiving surface and pressure is applied, for example by rubbing the tip of a ball point pen or the like over the selected symbol or part thereof. Assuming the symbols provided on the carrier sheet to be letters of the alphabet, for example, one can apply lettering to one or more books, control boxes etc. of electronic equipment, and in like locations. The sheets may be used for the "blocking" of books, application of lettering and/or instructions on control panels, and in virtually any location where symbols are required. The arrangement of the present invention has the advantage over prior comparable proposals in that it is quite inexpensive to use, it does not require the presence of supplementary heat-generating blocking equipment and, above all, the resultant symbols, as transferred to the receiving surface, can have a highly metallic mirror-like appearance which has not been possible with the prior known systems.

As has already been mentioned, the drawings illustrate the various steps or stages of the method of the invention separately and independently of one another. It will readily be appreciated that the method can be set up to be effected as a continuous process, the carrier sheet and the foil sheet being in continuous webs which are united in a moving process, whereafter the united webs pass through the various described stages, (therebeing, for instance, two substantially identical continuous printing machines), the eventual webs being severed into handleable sheets.

#### CLAIMS

1. A method of making a dry transfer of the kind described which comprises: register marking a translucent carrier sheet having over one surface thereof a layer or coating of metal foil, printing said sheet with desired symbols on the metal foil layer or coating side thereof, exposing the so-printed carrier sheet to an etching medium so as to etch away the non-printed portions of the metal foil layer or coating, and thereupon printing the sheet, over the printed symbols only, with a pressure-sensitive adhesive, using the register marking to achieve registration of the printing.

2. A method as claimed in claim 1 further including the step of overlying the surface on which the adhesive is disposed with a protective sheet of a suitable release paper.

3. A method as claimed in claim 1 or 2 wherein the carrier sheet is of heat-resistant polyester plastics, and the metal foil layer or coating is laminated thereto using an adhesive between the sheet and the metal.

4. A method as claimed in claim 1 or 2 wherein the carrier sheet is of a polyester plastics onto which the metal coating or layer has been applied by vacuum deposition.

5. A method as claimed in any preceding claim wherein the register marking can be ef-

fectd by means of notches in one or more edges of the sheet, by marks on the sheet, by ensuring that the sheet is cut accurately to size and/or shape so that one or more corners or the like may be used for registration.

6. A method as claimed in any of claims 1 to 4 wherein the register marking is effected by punching or perforating the sheet at least at two positions to provide apertures for engagement with pegs or the like on the printing machine(s) to ensure registration.

7. A method of making a dry transfer substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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